SCIENCE.

FRIDAY, MARCH 12, 1886.

COMMENT AND CRITICISM.

THE ENGLISH JOURNALS contain an abstract of an interesting paper read before the Statistical society, on Feb. 17, by Dr. W. Ogle, on "Suicides in England and Wales in relation to age, sex, season, and occupation." The proportion of suicides is 72 annually per million persons living. The suicide-rate increases rapidly until after middle life, but, in the more advanced age periods, again diminishes. The maximum rate is in the 55–65 years period, when it reaches 251 per million. The male rate is far higher than the female, with the exception of the period between 15 and 20 years of age, when the female rate is slightly in advance. The occupations in which suicide-rates are lowest are those which imply rough manual labor, carried on mostly out of doors. The occupations with the highest suicide-rates are those which are sedentary, like the learned professions, and also such as notoriously lead to intemperance. As regards farmers, suicides nearly doubled in the two years 1879–80, when agricultural distress was most acute; and simultaneously with this rise in their suicide-rate there was a corresponding rise in their registered bankruptcies. The amount of suicides varies with the seasons, forming a regular annual curve, of which the minimum is in December, and the maximum in June. The commonest method of suicide is hanging; then follow in order drowning, cutting or stabbing, poisoning, shooting. Women, however, select drowning before hanging, and poisoning before cutting or stabbing. Women take any poison indifferently: men choose painless and sure preparations. The choice of method is also affected by age, the young showing a comparative preference for drowning, poisoning, and shooting; by occupation, men preferring the instruments of their trades; by season, drowning being avoided in cold months.

MR. W. A. DUN has contributed an article on 'A local weather bureau' to *The present*, a monthly periodical published in Cincinnati. He contends that the signal service needs more observers, more stations, more frequent localized weather forecasts in less ambiguous language, and better means of diffusing their predictions; and, further, that the predictions as received from Washington should be open to amendment by competent observers in the various districts of the country, who have the advantage of seeing the local conditions, and being experienced in the peculiarities of their region. The suggestions are worthy of attention, as they come from a writer in sympathy with the success of the weather bureau, and not from one of the numerous irresponsible and ignorant critics of the service. The attempt to carry out some such plan as here suggested is to be made by the meteorological department of the Cincinnati society of natural history, that was organized last autumn. Its progress will be watched with interest.

RESTRICTIONS HAVE RECENTLY been proposed, limiting the hours of instruction in philosophy for students in the Austrian gymnasia. Most of the instruction in psychology, logic, and ethics, in German gymnasia, where it is still retained, is poor, traditional, and along the old-school ruts of Herbartism, as an inspection of the many school manuals shows. In the hands of many university professors, philosophy is degenerating in Germany. The historical methods so in vogue a decade ago, are still attractive to many students, but constantly less so; while the interminable changes rung on Kant's familiar problems have well been called the pure survival in modern form of scholasticism, till the cry is already heard from extreme neologists, that, instead of going back to Kant, he must be forgotten, if academic philosophy is ever to have a needed regeneration. Many students have become so practical that they cannot hear the word 'philosophy' without a grin, so current have become caricatures of its nature. The new scientific methods it has assumed may yield gradual amelioration of this state of affairs. 'Systems' should be left to decay, and metaphysics be seen to belong to science no less than to philosophy. One special object or result of philosophy is to make men uncertain where they once thought they knew. If young men are so taught that the great open questions whence flow all intellectual interests are closed

up, they had better know no philosophy at all; and those instructors who use their department to establish certainties in those matters where the most honest and wise men differ, are they who have brought it into its present disgrace. The same problem is sure, sooner or later, to arise in this country. Trustees and other college authorities are already beginning to ask whether, in the competition of many fresher and more vital interests, our old philosophical chairs cannot be at least reconstructed, and be made more practical in an ethical way. It is at least certain that those who intend to represent this department in our colleges in the future, must place themselves on far more scientific and ethico-practical foundation in the preliminary training they give themselves than ever before, whatever philosophic convictions they may cherish. One of the saddest illustrations of educational over-supply in our land at present, is the number of bright and able young men, well trained at home and abroad in the philosophical discipline from the slowly dissolving stand-point of the theory of knowledge, who can find no employment, on the one hand, and, on the other, the number of academic institutions now vainly seeking instructors in this department, embued with a more practical and a more scientific spirit and method.

Late news from Spain conveys definite intelligence of the recurrence of cholera, a number of fatal cases having been reported from Tarifa, in the southernmost part of the peninsula. We hear but little at present of the probability of the appearance of this dread epidemic in the United States, yet those who are acquainted with the histories of previous invasions need not be reminded that our danger is by no means past. Its duration in Europe is not limited to two or three years. The epidemic of 1829 was not extinguished till 1836, and the one of 1847 extended into the winter of 1855–56, while that of 1865 did not disappear till 1873. Already the disease has effected a landing in the western hemisphere, at Cayenne; and our immunity, so far, is doubtless due to the fact that our largest immigration has not been derived from the parts of Europe where the disease has been prevalent. In a recent report of an inspection of the Atlantic and Gulf quarantines, made under the direction of the Illinois state board of health, Dr. J. H. Rauch has given it as his conviction that the epidemic may be effectually excluded from the United States by an intelligent use of the agencies still at our command. Cholera has never yet been kept out of this country after becoming epidemic in Europe, but the possibility of excluding it is a subject that should properly engage the attention of national authority. The control of quarantine has hitherto remained entirely under state jurisdiction; but in the face of such an epidemic, threatening the whole nation, the matter of rigid quarantine is not one of local importance, and should not be relegated to local authorities.

The spread of the disease in Spain, dependent, as it is now being clearly seen, largely upon a lack of proper sanitary measures, furnishes a lesson that should not be lost. Of all the large towns in Spain, none suffered so severely as Granada. The river Genil, which passes through this city, has, a few miles above, near its confluence with the Aguas Blancas, a number of large paper-mills situated upon its banks, through which a part or all of its waters pass. A large part of Granada is dependent upon this river for its supply of water, notwithstanding the fact, that, when it reaches the city, it is manifestly impure from the contamination by the mills. The filthy rags used in the manufacture of paper at these mills were imported from the province of Valencia, where cholera had been prevalent for some time; and the first cases at Granada occurred in the districts supplied by the Genil. Possibly there is no connection between these two facts, yet it is hard to believe that they do not stand in some relation to each other, and further evidence seems almost conclusive. After Granada had itself become a source of infection, the sewerage discharged into the river carried the disease through the province of Granada, and even into the province of Cordova. Village after village along the banks became successively invaded by the dread disease, with the single exception of the town of Loja, with its twelve thousand inhabitants, where alone the people derived their drinking-water supply from different sources. The fatal effects resulting from river-pollution are apparent, not only from this, but other illustrations throughout Spain, and the warning conveyed should not go unheeded.

That dreaded scourge of European vineyards, the Phylloxera, for which, as well as for the al-

most as injurious grapevine mildew, certainly no debt of gratitude is owed to North America, notwithstanding stringent laws, is widely extending the fields of its devastation. A correspondent of *Nature* states that it has already made its appearance in the vineyards of Cape Colony. In a few places the pest has been found in swarms, and efforts are being made to stamp it out, or at least hold it in check. Unfortunately the habits of the insect are such that it is hardly possible that the calamity threatening the grape-growing interests there can be wholly averted.

THE NAVAL OBSERVATORY.

THE report of the National academy of sciences upon the naval observatory demands attention, not only from all interested in scientific affairs, but from those who desire only to see good administration. In reading the report, the first question to present itself to the mind of the candid inquirer would be, How does it happen that the national observatory of the country has remained so long under the direction of superintendents who were not astronomers, and whose profession has little direct relation to its work? A partial answer to this question, from the naval point of view, is found in letters addressed to President Barnard by the present superintendent, and published as an appendix to the report. In justice to Commodore Belknap, we must say that his arguments bear rather upon the question of the usefulness of the institution to the navy than upon that we have just suggested; but the two are so closely related, that, in answering one, he evidently intends to answer the other. It will therefore be interesting to examine his arguments, and note their bearings upon the several points at issue.

Commodore Belknap cites seven kinds of services which the observatory renders to the navy. A very slight consideration will, however, show that every one of these services could be rendered as well or far better by a national observatory under civilian authority; and, indeed, by an establishment far more modest in its outfit than even the present naval observatory, to say nothing of the projected new one. The navy-yards could get their time from the nearest railway-station with ample accuracy for business purposes. Naval ships in port could compare their chronometers with signals from a national observatory as well as the mercantile marine could, and any superiority for naval purposes which might invest a time-signal tapped over the wires by the hand of a commissioned officer might fairly be deemed counterbalanced by the skill of a civilian astronomer trained in this special business. The naval chronometers could be kept, tested, and rated at least as thoroughly at a national observatory as they are at the present naval observatory. Indeed, this is actually done at the Greenwich observatory, for all the chronometers purchased for the British navy. It could be better done at the Brooklyn navy-yard, whence most ships take their departure, by erecting and equipping a little observatory for this purpose at a cost of ten or fifteen thousand dollars, thus saving the expense, and danger to the rates of chronometers, incurred by transporting them back and forth between New York and Washington.

That officers who had never worked in an observatory till they went to take charge of one would not find their task smooth sailing, is to be expected; but we should never have anticipated such a picture of difficulties of administration as is held up by Commodore Belknap in one of his letters which appears in this report. It seems that Prof. Newcomb, in a letter to President Barnard, drew attention to the curious fact, that during the first twenty years of the existence of the observatory, when two instruments, the transit and the mural circle, were required to completely determine the position of a star, there was no concert of action between the observers with these instruments by which they should observe the same stars. Commenting on this subject, Commodore Belknap remarks, "It may be considered as an ideal state of things where two men of equal age and upon equal footing (with no military ideas of subordination) can engage in work upon two instruments, with but one clock and one chronograph between them, and have every thing go smoothly and without jealousy. The abandonment of the too ambitious programme first laid down was a matter of necessity, which it is probable no one regretted more than the superintendent."

To appreciate this picture, we have to reflect that only one of the observers needed a chronograph, and that the only use either of them had to make of the clock was to look at it. We are therefore led to infer, as the outcome of forty years' experience, that under naval discipline it is not found possible for two civilian astronomers to take their time from the same clock without friction and jealousy; that in consequence a well-

planned but too ambitious programme of work, involving a concert of action between two such observers, had to be abandoned; and that the work of forming a star-catalogue had to be postponed until it could be done with a single instrument.

We have no grounds for challenging the accuracy of this statement. Two opposite conclusions are, however, drawn from it. The view taken by the naval superintendents is, in brief, this: if line-officers of the navy, trained from youth in the art of managing men and making them work together, cannot get two men to work in the same room, observe the same stars, and look at the same clock, what would be the result of intrusting such a task to a civilian astronomer untrained in naval discipline? No organization would last a week under such a *régime*. The view of the civilian astronomer is, that all the trouble is a necessary consequence of placing the work in charge of a man who knows nothing about its execution. Between these views we leave our readers to decide for themselves.

The commodore alludes to the 'so-called scientific men of the country' who want a national observatory, in terms which do not strike us as happily chosen. He tells these misguided men that 'the navy will take no responsibility' for their observatory, in a tone which evidently implies that the threatened absence of this responsibility would impress them with a deep sense of their rashness. Whether the commodore's threat will have this effect is a question for future consideration, and we shall dismiss the subject with a single remark. It has often been said that there is hardly a graduate of the naval academy who is not ready, with great alacrity and at a moment's notice, to take charge of the coast survey, the fish commission, or any other scientific work, without any consciousness that he is undertaking a more formidable task than standing watch on the deck of a ship. We have always looked upon this statement as a humorous exaggeration; but it is hardly possible to read Commodore Belknap's utterances without a feeling that the remark may have more truth in it than we had supposed.

THE SWAMPS OF THE UNITED STATES.

THE conditions which have determined the occupation of land in the United States differ widely from those which have controlled the settlement of most other countries. In other states there have been political or geographical limits which have greatly restrained the movements of population. In this country there has been, from the beginning to the present day, an abundance of good, readily subjugable land awaiting the settler. It is evident, however, that within this decade we pass from this old condition where excellent land was to be had for the asking. Before 1890 all such fields will have been occupied. There will be no more rich frontier lands ready to welcome the immigrant: therefore the tide of immigration will be turned upon the areas which have been passed in the swift westward movement of our population. These neglected districts are of great extent and very varied nature. They consist, in part, of land which is somewhat less fertile than the best soils, but which in every other respect is fit for tillage. In larger part, however, these unoccupied districts, which constitute the land-reserves of the United States, afford soils which contain the elements required for the most profitable crops; but they are rendered infertile by an excess or a deficiency of water. In the arid but irrigable regions, and in the inundated or swamp lands, we have a very large tillable area which may be won to agriculture; and, when so won, these lands will afford resources of the utmost importance to the people.

In his report on the lands of the arid region of the United States, published in 1879, Major J. W. Powell has given an admirable account of those districts where the soils suffer from a deficiency of water, and in the preface to that report he notes the importance of the class of inundated lands; but so far, no detailed studies of the latter class of lands have been prepared. Recently, however, Major Powell has organized a division of the U. S. geological survey, which is charged with a careful inquiry into the geological history and physical conditions of the swamps and other inundated lands of the country.

A preliminary study of the field has shown the remarkable fact, that, owing to the abundance of cheap land which could be easily won to tillage, we have left untouched, in the region east of the Mississippi, districts of easily drained swamp-lands amounting to more than fifty thousand square miles of area. These lands have the same nature as those which, in England and the states of northern Europe, were drained centuries ago, and now afford the most fertile fields of those countries. The inundated lands of the seaboard region of the United States, as well as the lands of the lower Mississippi, remain in the state in which they were when first seen by men, while the similar areas in England were long ago won

to the state of the most fertile fields of that country.

Our American inundated lands are divisible into several classes, determined by the condition of their origin. Of these, the most important are the tide-water marshes, the lacustrine swamps of the glaciated district, the delta swamps of the Mississippi, and the class of wet lands or upland swamps where the marshy condition is due to the action of plants in retaining water under the surfaces of considerable districts. The formation of the sponge-like sphagnum-peat has been well described; but it is evident that a very large part of the southern swamps of the United States are essentially climbing bogs, though the retention of the moisture is due, not, as in the north, to the mosses, but to the close-growing, flowering plants, principally to the common cane.

Preliminary studies of the great area of fresh-water marshes, extending from the mouth of the James River to the south of Albemarle Sound, show, that, in that district, this class of marshes covers an area of about four thousand square miles. Throughout this district the peaty deposit is generally thin, not usually exceeding four feet in thickness, thus permitting the roots of the trees to force their way to the subsoil below the decaying vegetable matter.

The surface of the swamp, as well as the substratum on which it rests, is generally inclined towards the natural drainage of the country to the amount of two feet to the mile. The water is retained by the dense mat of stems, roots, and decaying fragments of plants, which are so closely interlaced that the friction in the interstices prevents the speedy outflow of the rainfall.

This class of marshes can be easily and cheaply drained, and, when so improved, they afford exceedingly rich soils. Along the outer margins of these vast morasses, some hundred thousand acres have been won to culture. These lands are remarkably fertile; and I am told that they often yield fifty bushels of shelled maize to the acre, and that they endure tillage for a period of many years without fertilizing.

It seems likely that of these easily reclaimed upland morasses, resembling the Dismal Swamp, there is a total area, in the southern states, of not less than twenty-five thousand square miles. To these might be added the lands which are subject to serious inundations from rivers, which probably amount to something like eight thousand square miles.

In the northern states the area of improvable swamp-land is less extensive, but there is not a state in which they do not constitute an important part of the land-reserve which the coming generation will be glad to use. It is easy to see, that, in these inundated lands of the United States, we may find fields which will give a larger return to the husbandman than those now tilled in any state of the union; and, furthermore, that, with the rapid increase in our population, it is none too soon for us to be considering the aspects of this portion of our domain. It is clear that the national survey can, by a proper study of these swamp-districts of the country, so determine their condition as to prepare the way for the engineer. The aim will be to ascertain their extent, the conditions determining their value for tillage, and the best method of approaching the economic questions which they present. Even where these swamps may be unprofitable for agricultural use, it may often be found that they are admirably adapted for timber-culture. The juniper (Cupressus thyoides) and the bald cypress (Taxodium disticum) are particularly suited to this form of forest-culture.

The scientific aspects of the American swamps, their relation to the changes of level of the continent, the ways in which their deposits were accumulated, cannot be considered in this place. My aim at present is to call attention to the great economic importance of this field of inquiry.

N. S. SHALER.

GEOGRAPHICAL NOTES.

Russian Lapland. — Charles Rabot, during the past summer, obtained interesting details on the Kola peninsula, which lies westward from the White Sea and between it and the Arctic Ocean, in Russian Lapland. This region is very little known, and large blanks occur in the best charts. The country is rather monotonous, covered with forests, and dotted with lakes, some of which attain a large size. Imandra is a hundred and forty kilometres broad, surrounded by grand scenery, and hemmed in by two mountain-chains, which reach about three thousand feet in height, Umbdek, on the east, being a little the higher. There are no glaciers, but permanent snow exists on the peaks. After the Caucasus, this region contains the highest elevations of European Russia, and presents a desolate, barren, and impressive aspect. The lakes are very shallow: the greatest depth of Imandra does not exceed fifteen or eighteen feet, from which it shoals to a few inches. It contains many wooded islets. From this lake the explorer went to the Arctic shores, and crossed the unexplored region which extends westward from the lake. Here, where the maps indicate a flat country, he found a rugged region, bristling with mountains exceeding three thousand feet in height.

Between the White Sea and the Arctic Ocean the traveller found three series of ranges, separated by depressions covered with forests, marshes, and lakes. The Russian Lapps were well-made people, averaging over five feet in height. The people and officials everywhere gave him every assistance.

Precursors of Columbus. — Prof. Guido Cora reviews 'The precursors of Columbus' in a late number of the bulletin of the Italian geographical society. After an interesting *résumé*, he concludes that to Columbus is unquestionably due the opening of a new world to humanity as represented by civilized races; that the name of America is derived from some aboriginal word picked up by the companions of Columbus; that the precursors of Columbus, in their voyages toward America, were merely in search of wealth or prompted by a spirit of adventure, and not instigated by scientific prevision or the result of study of probabilities; that it is certain that the Scandinavians, Basques, and probably also the Irish, had reached American shores before Columbus; while to the brothers Zeno are due important charts and documents from which the previous discovery of America might be inferred.

Poliakoff's 'Journey in Sakhalin.' — A translation of Poliakoff's 'Journey in Sakhalin in 1881-82' has been made by Professor Arzruni, and published by Asher & Co. This forms a sort of monograph of the products, industries, and people of this little-known island, and is well worthy the attention of ethnologists and geographers. It contains especially rich contributions to the anthropology, mineral products, fisheries, and geography. The Ainos, who inhabit the southern portion, are exhaustively treated of. As the original documents are largely in Russian, this may be said to be for most students the first effective publication of the material.

Pilcomayo expedition to Bolivia. — Some news has been received from the latest expedition of M. Thouar, who is endeavoring to find a trade-route, *via* the Pilcomayo, between Bolivia and the Argentine states. He left Assumption Sept. 28, with an escort of twenty-eight experienced soldiers, two months' provisions, and a sufficient number of horses, mules, etc. A volunteer, Mr. Wilfrid Gilbert, accompanied the party. Major Feilberg, as mentioned by us at the time, recently ascended the river by water, finding a minimum of six feet of water in the channel up to Lambara, a point two hundred and fifty-five miles from the mouth of the Pilcomayo. Here the party was arrested by the rapids, over which there were not more than two feet of water, rendering navigation impossible, and deciding the return of the expedition. Since then an Argentine column, commanded by Captain Gomenzorro, has raided the borders of the river, killed or routed the people of the Toba tribe, living on its banks, and brought back a good deal of plunder and a few prisoners. Defeats of this kind, however, have not hitherto had much effect on the Tobas, beyond causing them to retreat temporarily into their jungles. They have avenged, as in the case of Crevaux, on other white men, the destruction visited on their villages. With this unpromising state of things, Thouar's plan of ascending the river by land, with the above-mentioned small escort, for the purpose of investigating the rapids and determining whether any improvement of the river at that point is possible, seems almost foolhardy; and it is to be regretted that the counsel of those who advised an expedition by water was not adopted.

LONDON LETTER.

THE University of Cambridge has just suffered a severe loss by the death of its librarian, Mr. Henry Bradshaw, senior fellow of King's college. The present efficiency of the university library is almost entirely due to his untiring efforts during the many years that he was at its head. His bibliographical investigations were remarkable for their accuracy, and were carried out with a truly scientific precision, while he took a special interest in that department of his duties which was connected with the literature of systematic zoölogy. Others will follow him in the post of university librarian; but it is not given to many men to be so truly mourned as Mr. Bradshaw is by the many generations of Cambridge men who knew and loved him. The terms of the university statutes require that the post shall be filled within a fortnight of its becoming vacant; and it is probable that the choice of the electors will fall upon Prof. W. Robertson Smith, the editor of the 'Encyclopaedia Britannica,' who is so well known in the subject of Old-Testament criticism. He is a fellow of Christ's college, and lord-almoner's reader in Arabic to the university.

The school of engineering at Cambridge has been making considerable progress of late years under the direction of Prof. James Stuart, M. P. for Hackney; and it is now proposed to institute a tripos examination in engineering, which should be combined to some extent with the natural sciences tripos, and would include a very considerable amount of practical work, together with some of the higher branches of mathematics.

Honor candidates who find a difficulty in mathematics need no longer be troubled with them among the 'additional subjects' of the previous

examination, which are incumbent upon all who propose to enter for a tripos, for French and German have been introduced as alternative subjects. This will be a great boon to the classical men, who have hitherto been obliged to pass a mathematical examination before they could get classical honors. In fact, the 'additional subjects' of the 'Little Go' are merely a relic of the time when candidates for honors in any subject had first of all to graduate in mathematics; and the result of this was that many of the best classical men contented themselves with ordinary degrees. Now, however, all this is changed, and their path to distinction is much easier than it used to be.

A movement of the same kind is on foot in the University of London also. At a recent meeting of convocation (to which all graduates of a certain standing have the right to belong) a committee was appointed to consider the desirability of the establishment of degrees in engineering. The first meeting of this committee is to be held to-day. It is within the knowledge of the present writer, that many well-established engineers are feeling the want of a knowledge of electricity, and hence it seems desirable, that, for any degree in engineering, a theoretical as well as practical acquaintance with electricity should be exacted from all candidates.

Probably the most complete private electric installation in the world is now to be found at the house of Sir David Salomons, Bart, at Tunbridge Wells, about thirty miles south-east of London. On several occasions lately, he has kindly invited parties of leading electricians and engineers to inspect it, and most hospitably entertained them there. The boilers, steam-engines, generating-dynamos, etc., are all in duplicate; and opening out of the room containing those, is a large and very complete series of the E. P. S. storage-batteries. Under ordinary circumstances, the engine does not run more than six or eight hours daily. In a sort of annex to the house is a magnificent private workshop, with lathes, saws, planing-machines, and all sorts of 'tools.' The whole of these are worked from two or three motors, which put in motion the overhead shafting. Many thousand pounds must have been spent upon this unique installation.

The discussion upon Prof. D. E. Hughes's paper, upon "The self-induction of an electric current in relation to the nature and form of its conductor," was concluded last night at the Society of telegraph engineers and electricians. During the three evenings devoted to it, Lord Rayleigh, Prof. George Forbes, Professor Ayrton, Dr. Hopkinson, Prof. S. P. Thompson, Dr. Fleming, Mr. Frank Pope of New York, Mr. Preece, and many others expressed their sense of the very great value, ingenuity, and originality, of Professor Hughes's researches, — an opinion which was universally re-echoed in conversation among the members generally. Great applause greeted the proposal with which Dr. Fleming (of the Edison light company) closed a very effective speech, to call the co-efficient of the unit of self-induction a 'Hughes.' Both Mr. Frank Pope and Mr. Preece, as practical telegraphists, pointed out how the experimental results now obtained by Professor Hughes provided a clear explanation of certain remarkable facts observed in telegraphy; and Mr. Preece paid a warm tribute to Professor Hughes's ingenuity by pointing out, that, whereas the speaker had had to erect a pair of lines two hundred and seventy-eight miles in length to compare the telegraphic speed of iron and copper wires, Professor Hughes's wonderfully ingenious and delicate induction-bridge had enabled him to predict the same result from experiments upon only ten inches of wire. Perhaps the most important practical feature in the paper was that self-induction in iron wire could be cured by stranding the wire; but all of the results are a remarkable illustration of science enriched by practice. W.

London, Feb. 26.

BOSTON LETTER.

THE topographical survey of Massachusetts, undertaken by the state in conjunction with the U. S. geological survey, has now been in progress for a year and a half, and about 3,250 square miles have been surveyed, or somewhat less than half the state. The parts already covered include the extreme western border of the state, embracing our highest elevations; two central sections, — one at the Connecticut, and the other around Worcester; the region about Boston; and almost the whole of the area to the south of it, lying to the east of Rhode Island, the character of which is very different from other parts of the state, hardly any parts of it being commanded by elevated positions. Hence, in surveying this, the plane-table has been laid aside, and the whole district has been mapped by traverse work; the courses of the streams, and the shore-lines of the open water spaces, being worked in by a winter party taking advantage of the ice. There is also a little completed patch in the extreme north-eastern corner of the state.

According to an estimate made by the commissioners of the survey, the cost of the work the past season has varied from about eight to nineteen dollars per square mile, and an average of a

little over ten dollars. By request of the commission, the U. S. coast survey has also aided the work by extending its triangulation over about nine hundred square miles during the past season, at a cost of a little less than two dollars a square mile, about a fourth of which has been borne by the state.

A year ago the state appropriated nine thousand dollars to enable the commissioners to take advantage of the progress of the present survey to determine by triangulation the boundary-lines of all the towns of the commonwealth. A commencement of the work was made the past season, only to discover that the estimate of the expense, based on the irregularities shown in the boundary outlines as given in the old state map, — the only possible basis for a calculation, — was far too little; probably at least double the original estimate will be required. As less than twenty-five hundred dollars have been expended, the abandonment of the scheme would be no severe financial loss; but the commissioners rightly urge its continuance under a doubled appropriation, as, when completed, it will form the best basis for a cadastral or property survey yet provided by any state in the country. This is only one of a number of ways in which our legislators are beginning to learn what it costs *not* to have a good state map, and there can be little doubt that they will be witty enough to carry the intended boundaries survey to completion.

Among the numerous partly executed plans for the improvement of Boston, its schemes of public parks hold a prominent place. The recent death of Hon. Elizur Wright has called attention anew to his proposal to establish a forest-preserve within easy reach of Boston, in the wild and little-inhabited region known as the Middlesex Fells, — a region belonging to some half-dozen municipalities, and situated on the Charlestown or northern side of Boston, not half a dozen miles from the city. On the opposite side, progress is making in the Arnold arboretum, which now forms part of the Boston park system, where definite plans, long maturing, are being put into execution. It is proposed to form two distinct collections of growing trees, — one for display; and one, less permanent, for investigation and experiment. The plan of the former contemplates, among other things, that each hardy-tree species of eastern America shall be represented by an individual planted so as to secure the maximum growth attainable here, and also by a group of from six to twenty-five individuals selected to show variations of character and habit, and planted so as to secure expression in mass rather than perfect individual development. The representation of no species will therefore depend on the life of one tree, and the natural behavior of our principal trees will also be illustrated.

The Appalachian Mountain club celebrated its decennial anniversary last Friday by a dinner at the Parker House; Prof. E. C. Pickering, whom every one recognizes as the founder of the club, presiding. As a first experiment of the kind, it proved a great success. About one hundred and twenty-five members were present, about equally divided between ladies and gentlemen, and sat to a late hour. After dinner, speeches were made by Profs. W. H. Brewer of New Haven and C. A. Young of Princeton, and by many of the home members, with letters from those who could not be present. The club may well be proud of what it has accomplished, having succeeded in obtaining a paying membership of considerably over six hundred in these ten years, and in publishing more than three volumes of *Appalachia*, — a journal which, with its two sides of mountain exploration and geographical science, holds a somewhat unique and enviable place in literature. A new number is announced to appear immediately.

It is announced that the liberality and co-operation of the Woman's education association will enable the Boston society of natural history to open its seaside laboratory at Annisquam to students, during the coming summer, from June 15 to Aug. 15, 1886. Mr. B. H. Van Vleck, an assistant in the laboratory of the society, will have charge of the instruction. Y.

Boston, March 8.

NOTES AND NEWS.

THE danger of poisoning from arsenic in wall-papers is a subject attracting considerable attention in Boston. At a public meeting the past week, called for its consideration, a draught of a bill was submitted, prohibiting the manufacture and sale of such papers when they contain more than one-fourteenth of a grain of arsenic to the square yard. A number of cases of illness from this cause were reported, as also the death of one child from the wearing of stockings colored by arsenic.

— A resolution has been introduced in the senate, empowering the superintendent of the Coast and geodetic survey to loan any instrument or instruments named in a list to any college or incorporated institution of learning in the United States, to be retained by such college or institution until the dissolution thereof, whereupon such instrument or instruments shall, if existing, be returned to said survey.

— The house committee on agriculture has reported favorably a bill to establish agricultural experiment-stations in connection with the colleges in the several states. The object and duty of these stations are to conduct original researches or verify experiments on the physiology of plants and animals; the chemical composition of useful plants; analysis of soils and water; the composition and digestibility of different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese, etc. The appropriation sought is $15,000 a year for each state, or $570,000 in all. Similar experimental stations have been conducted in Europe with great success for the last thirty years, and at the end of 1884 there were one hundred and forty-eight in existence there. There are now nine stations in this country.

— It has been decided to abandon the governmental tea-farms recently established, as they have not been productive of good results.

— The Prince of Monaco, it is reported, proposes the attempt to ascertain the course of the Gulf Stream by means of submerged floats, which will not be subjected to the influence of the winds. It is also said that the co-operation of the British authorities has been asked in the scheme.

— A recent London telegram announces that Mount Etna is in a state of eruption. It is supposed that lava is issuing from the crater, but the dense mist prevents observations. Slight shocks of earthquakes have been felt in the immediate vicinity, and stones and cinders are continually being thrown out.

— Active steps are being taken for the founding of a Hebrew university in New York City. It is proposed to make it a thoroughly orthodox sectarian institution, chiefly with the object of educating young men for the ministry. In addition to voluntary subscriptions, it has been proposed to rely upon a tax on the different Jewish congregations.

— Prof. A. C. Merriam of Columbia college, whose editions of Herodotus and the Odyssey, and more particularly his investigations in Greek archeology, have gained him a foremost place among the classical scholars of this country, has been elected director of the American school at Athens, for the year 1887–88. While in Greece, Professor Merriam will pay particular attention to archeology, especially Cyprian.

— The cost of small-pox to Tennessee is estimated by the State board of health to have been nearly one hundred and fifty thousand dollars during the past five years.

— Russian papers have lately been discussing the project of a canal between the Sea of Azov and the Caspian Sea, with speculations upon the probable effects of the higher water-level of the former. The shores of the Caspian Sea are low, and there is a question whether or not they would be inundated.

— An article by G. L. Kittredge in a late number of the *American journal of philology* describes a singular custom among the Greeks. An ancient Greek, if he murdered a man, sometimes mutilated his victim in a peculiar way, known as μασχαλίζειν, or arm-pitting. The extremities of the hands were cut off, strung together, and fastened under the arm-pits of the corpse by a band or girdle round the neck. There are two main theories as to the purpose. According to the one, the μασχαλίζειν was a part of the ἀφοσίωσις. The cut-off extremities were the ἀπαρχή of the victim, a sin-offering to the infernal gods to expiate the murder. According to the other, the mutilation of the body was supposed to effect a corresponding mutilation of the soul; so that the shade, deprived of its limbs, would be powerless to take vengeance on the criminal. It is the latter view that the writer advocates, formed on the basis of a close examination of the *loci classici*, and next by a long array of evidence from the history of culture.

— An extract from a letter recently received at the hydrographic office from the master of the Russian bark Preciosa, at New Orleans, states, that "on the 26th of January, at six A.M., the vessel being in latitude 17° 04′ north, longitude 69° 07′ west, running with all sails set, steering west, speed ten knots, wind fresh, north-east, I felt what I considered to be a strong earthshock. It threw the vessel over a good deal, and at the same time we shipped a heavy sea, although the vessel was in ballast, and the water had been smooth all the morning. It only lasted for a few seconds, and, directly after, the wind went to the south-east, and died away; afterwards it was nearly calm for the three following days."

— We would call the attention of amateur astronomers to a very convenient collection of ephemerides, etc., contained in the 'companion' to *The observatory*, for 1886. Positions for the sun, moon, and major planets, are given at suitable epochs, with ephemerides for the satellites of the planets, and in many cases for physical observations. There are also lists of double and variable stars, test objects, remarkable nebulae and clusters, etc., all made easily accessible and intelligible.

— The Transactions of the seismological society

of Japan, vol. viii. 1885, contains a long paper by Professor Milne, in which he has collected a detailed description of ten series of experiments carried on at different times from 1881 to 1884, for the purpose of investigating phenomena connected with earth vibrations. The experiments were all performed in or near the city of Tokio, and consisted in originating artificial earth vibrations, usually by dropping a heavy weight or by exploding dynamite, and then studying the circumstances of their propagation by means of the various seismographs which have been devised by himself or his co-workers in Japanese seismometry. It appears that the first effect upon a seismograph with a single index is an impulse in a normal direction; and, similarly, a bracket seismograph arranged to indicate normal motion begins its indications before a similar seismograph indicating transverse motion, implying that the normal wave travels more rapidly than the transverse. Near to an origin, the normal motion is first outwards, then inwards, and the motion inwards is greater and more rapid than the motion outwards; while, at a distance from an origin, the first motion may be inwards, and the two phases are practically of equal amplitude. Roughly speaking, the amplitude of normal motion is inversely as the distance from the origin. The laws of transverse motion are practically the same with those of normal motion, but less pronounced. Near to an origin, the amplitude of the transverse motion is less, but the period greater, than that of the normal motion. The velocity of transmission obtained varies from two hundred to six hundred feet, which is much less than the velocities obtained by Mallet and by Abbott.

— Uhler's check-list of the Hemiptera heteroptera, or true bugs, of North America, recently published, contains 1,448 species, distributed among 425 genera, or an average of 3.6 species to each genus. Classification here, as in some other branches of entomology, appears to have been carried too far, though doubtless many more species yet remain to be discovered.

— Drs. D. E. Salmon and T. B. Smith have just published (Proc. biol. soc. of Washington, vol. iii.) a remarkable discovery, made by them, of a new method of producing immunity from contagious diseases. By experimenting upon pigeons, they were able to establish an immunity from the disease known as swine-plague, by the inoculation of solutions in which the pathogenic bacteria had been cultivated, and afterwards destroyed by heat. The conclusions they reach are as follows: 1°. Immunity is the result of the exposure of the bioplasm of the animal body to the chemical products of the growth of the specific microbes which constitute the virus of contagious fevers; 2°. These particular chemical products are produced by the growth of the microbes in suitable culture-liquids in the laboratory, as well as in the liquids and tissues of the body; 3°. Immunity may be produced by introducing into the animal body such chemical products as have been produced in the laboratory.

— Professor Davidson, in a paper on the temperature of the water of Golden Gate, in Bulletin No. 4 of the California academy of sciences, states, that, from a mean of nearly ten years' observations, the lowest temperature is for the month of January, 50°.49 F.; and the highest for the month of September, 59°.68 F. The average range is thus only nine degrees, and the extreme range has only been thirteen degrees. The temperature of the air follows closely that of the water; and it is the uniformity of the latter's temperature along the Pacific coast, and its coldness, which conspire with the north-west winds of summer to cause the peculiar foggy conditions which prevail.

— In the Proceedings of the Linnean society of New South Wales, Dr. Lendenfeld reports upon a sponge destructive to oyster-culture. Large areas of oyster-beds in the Clarence River were destroyed by their attaching themselves to the shells, preventing the formation of spat. With the destruction of the beds the sponge disappeared. The latter he describes under the name Chalinula Coxii.

— Examination of the cheese, which some time ago caused the sudden and severe illness of several hundred persons in Michigan, has shown the poisonous character to be due to a peculiar crystallizable substance, or ptomaine, of an intensely cheesy odor, to which the discoverer, Dr. V. C. Vaughan, has given the name of 'Tyrotoxicon' (*Zeitschr. f. physiol. chemie*, x. 146, 1886).

— Dr. Ten Kate, the anthropologist, has been pursuing his investigations in Dutch and British Guiana, and intends to extend them into Venezuela and Florida, chiefly with reference to the Carib Indians. He has already measured, in a very detailed manner, one hundred and six individuals of the Arrowak and other tribes, wood negroes and métis.

— Major Powell has submitted to the commission investigating the question of the proposed consolidation of the various scientific bureaus his reply to the recent strictures of Professor Agassiz upon the work of the geological survey. The letters have not yet been made public, and are to be printed in connection with the testimony taken

before the committee now investigating the subject.

— The Abbe Laflamme, of the University Laval at Quebec, has lately read an essay on the physical geography of the Saguenay, before the society of geography in that city. He first describes the actual geographic form of the district, and then discusses its geological history, even from Archaean times, with special reference to the formation of the old limestones that lie in basins on the crystalline rocks as an early chapter, and to the glacial invasion as a later one. The present discharge of Lake St. John is recognized as post-glacial; the old outlet being more or less obstructed by drift, and in part occupied by Lake Kenogami. The deep gorge of the lower Saguenay is attributed to ordinary erosive action through long geological periods, and the cañon of the Colorado is called recent in comparison with it.

— The programme for the first half of the course of weekly lectures at the national museum is as follows: Saturday, March 6, Mr. William Hallock, The geysers of the Yellowstone; Friday, March 12. Prof. William Harkness, How the solar system is measured; Saturday, March 20, Prof. T. C. Mendenhall, The nature of sound; Saturday, March 27, Prof. F. W. Clarke, The chemistry of coal; Saturday, April 3, Dr. C. Hart Merriam, The migration of birds.

— The bill now before congress, providing that from and after March 4, 1892, the metric system shall be exclusively employed in the several departments of the government, was favored by the Boston society of civil engineers, at their meeting the past week.

— An account of a singular habit in the cicada is related and illustrated by J. S. Newberry in the *School of mines quarterly*. In Rahway, N.J., a house had been built and a cellar dug in an orchard some time before the appearance of a brood of cicadas. The unused cellar was opened about the time of their advent, and the bottom was found to be thickly set with mud-cones or tubes from six to eight inches high and an inch or more in diameter, each of which had been formed by the pupa of a cicada that had emerged from the earth beneath the cellar. Finding a dark chamber, and apparently desiring to work up to daylight, the cicadas had taken the moist clay and of this formed pellets, with which the tubes were built up, apparently with the purpose of bridging over the vacancy, and thus reaching the surface. The tops of all were closed; but, on breaking some of them, the pupae were seen, both in the hole in the ground and in the cone. After the cellar was opened, and light admitted, they stopped building, and made holes in the tops of the cones for exit. The author further remarks that in these facts there is evidence of the exercise of intelligence in the cicada, and a judicious adaptation of means to an end in circumstances that, it would seem, must have been without precedent in the experience of that or any preceding generation, and therefore for which no education of ancestors could have given a preparation. It is possible that the pupa of the cicada is sometimes embarrassed, in its ascent to the surface by water, by too wet or too dry sand or mud; but it is hardly possible to imagine circumstances where the construction of a tunnel would be necessary. There seems to be no adequate explanation of the phenomena that will bring them within the scope of the theory according to which all our organs and faculties are the result of formative influences progressively developed through a long line of ancestors.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Bishop's ring during solar eclipses.

THE persistent visibility of Bishop's ring — the dusky reddish ring around the sun — gives interest to the following extract from Langley's 'Report on the Mount Whitney expedition,' which recounts observations made at his camp, at an elevation of about twelve thousand feet, on Aug. 19, 1881. "The sky to-day, as always, is of the most deep violet-blue, such as we never, under any circumstances, see near the sea-level. . . . Carrying a screen in the hand between the eye and the sun, till the eye is shaded from the direct rays, it can follow this blue up to the edge of the solar disk without finding in it any loss of the deep violet or any milkiness as it approaches the limb. . . . It had been part of my object to make an effort to see the solar corona by directly cutting off the sun's light by a very distant cliff. . . . On the south of the camp was a range of cliffs running nearly east and west, and whose perpendicular wall rose from one thousand to two thousand feet. I found that I could choose a position on the north of the cliff, along whose edge the sun was moving horizontally; so that the shadow was fixed as regards the observer, and so sharp, that, though I must have been over a quarter of a mile from the portion of the cliff casting it, I could, without moving my place, and by only a slight motion of the head, put the eye in or out of view of the sun's north limb. The rocks were, in these circumstances, lined with a brilliant silver edge, due to diffraction. This I had anticipated, but now I saw, what could not be seen by screening the sun with a near object, that the sky really did not maintain the same violet-blue up to the sun, but that a fine coma was seen about it of about 4° diameter, nearly uniform, though it was sensibly brighter through the diameter of 1½°. Upon bringing to bear upon it an excellent portable telescope, magnifying about thirty times, I found it was composed of motes in the sunbeam, be-

tween the diffracting edge and the observer's eye" (Signal service, professional paper, xv. p. 41).

So explicit a description as this from a well-practised observer confirms the testimony of European specialists in sky colors, and leaves no question whatever that Bishop's ring did not then encircle the sun. And yet, in the summer of 1884, it was so strongly colored as to attract attention from the guides in the Alps, and to call for special description from more scientific mountain climbers. It was generally visible on clear days in the winter of 1884–85, and on many favorable occasions through the following summer. During this winter, it has seemed to me to be generally less distinct than a year ago; but the most brilliant display that I ever recorded was shortly after noon on the 2d of last November, when the sun was hidden by a rather heavy sheet of cirro-stratus cloud, while the western sky was clear. The glaring and brassy central area was then enclosed by a ring of strong reddish-gold color, fifteen to twenty degrees from the sun; next came the delicate rosy or purplish pink, and at last the ordinary blue of the sky. The colors were wonderfully vivid.

Many if not most observers of the ring attribute it to diffraction on particles of some sort derived from the eruption of Krakatoa; and, while this hypothesis has much to recommend it, it cannot be denied that the continued visibility of the ring puts a severe strain on it. It is not to be wondered at that the cosmic origin of the colors has its advocates, and hence a method of determining the altitude at which the diffracting particles float is of especial value.

Dr. Zenker of Berlin has a pertinent article on the question in a recent number of the *Meteorologische zeitschrift* (Berlin, ii. 1885, 400–406), in which he discusses the effect that the altitude of the diffracting layer of dust will have on the visibility of the ring during total solar eclipses. And as a total solar eclipse, visible in South America and on the Lesser Antilles, will occur about half-past seven in the morning of the 29th of next August, we would request especial attention to this matter from astronomers who may go down to observe it. Dr. Zenker gives directions for observations on or near the central line of the moon's shadow, and shows how they may lead to the desired determination: for it is evident, that, if the diffracting dust were all within a few miles of the earth's surface, the colors of the ring would fade away in a few seconds after the disappearance of the sun; while, if the dust lie far outside of the atmosphere, some portion of the ring might remain visible during the whole eclipse. This question will deserve a share of the watchfulness generally given to the solar corona and infra-mercurial planets. W. M. D.

A trap-door spider at work.

A trap door spider, Cteniza Californica, which came from California in September, was put in a box with earth, and soon made a nest with a perfect door. She was found one morning occupying a hole three-quarters of an inch in diameter and deep enough to completely hide her, around which the ground had been cleared and smoothed, so that it was somewhat lower than the general level. Unfortunately, as this part of the work was done during the night, she accomplished it unobserved. She probably cleared the ground, however, as she had done on a former occasion, when she was seen to walk slowly sideways, with all the feet on one side held together, turning slightly at the same time, and sweeping all rubbish and coarser bits of earth before her. In digging the hole, she threw the earth to a distance, as was shown by numerous little irregular lumps of earth scattered over some moss at the farther side of the box. Later the spider was seen to dispose of more in the same manner, but it was done so quickly that the exact motion could not be distinguished.

During the day she busied herself in the burrow, apparently treading against the sides, in order to make a compact wall. At night she rested, and nothing more was done until the following evening, when she commenced to build a straight ridge or rim of earth at one side of the hole. She brought up as much earth as could be carried under the mandibles, and placed it on top of this rim. When it had been secured by several strokes of the fangs, the spider turned, and rubbed the spinnerets over the spot, and afterwards all along the edge. The spinnerets were applied directly to the surface, and were used not only to produce the silk, but also to smooth and model the edge.

This process was repeated until the rim was about a quarter of an inch in height, when the spider left it, and commenced a similar one on the opposite edge of the hole. Here she worked, as before, until she had made a ridge about half as high as the other, when she returned to the first, and during the next hour added to them both alternately. At the end of that time, she brought up the first load of earth which was not used in building, and deposited it as far away as she could reach, without leaving the burrow. As she withdrew, she turned, and attached a line of web to the edge of the second rim, by which it was pulled over the opening after she had disappeared from sight. Henceforth it was necessary to lift and turn back this rim (or flap, as it might now be called, to distinguish it from the true door) whenever she came up, unless, as sometimes happened, she had neglected to pull it down.

In the mean time, the first rim, which was to become the true door, had been gradually enlarged; but another hour elapsed before any attempt was made to pull it down. The spider then fastened a line to the upper edge, by which, after a long and steady pull from below, the structure was dragged over the opening, which it only half covered. It was immediately raised, and carefully re-adjusted in an upright position. After another half-hour, devoted to adding more earth to the two rims alternately, the first was again drawn down; but, being still too small, it was once more returned to the old position, and the work of enlargement continued. As nothing but persistence in this course seemed necessary to complete the door, the spider was allowed to work the rest of the night without supervision.

In the morning the spider had vanished. The entrance of the nest was closed, and the depression around it filled, so that its position was perfectly concealed. Naturally, it was supposed that the door was finished; but the next night proved this conclusion to be erroneous. When the spider was visited at three A.M., the door covered only three-quarters of the opening, and she was still employed in adding earth to the edge. During the day the entrance had evidently been closed by the true door and the flap, used together as a double or folding door, one side being much larger than the other. The flap, no longer

needed as a cover, was now turned back and pushed away, the opening thereby being considerably enlarged. More earth was subsequently placed over and around it, until it was completely hidden, and rendered useless. Before morning the true door had attained the necessary size, and the lining had been added to it; but the lining of the burrow was not entirely completed until some days later.

A piece cut from this door showed it to be a layer of earth with a single lining; while an old nest which came with the spider, and which she presumably made, was provided with a door having nine linings, each of the eight lower ones enclosing a rim of earth, by which the door had been enlarged.

MARY T. PALMER.

The destruction of birds.

In view of what has already been said regarding the manifold ways in which our wild birds are being effectually diminished, something more should be added in reference to a practice which has long prevailed in the southern tier of states, including Maryland. I refer to the systematic shooting of thousands of song-birds in spring and fall to satisfy a market demand. In the city of Baltimore alone the destruction of robins forms a periodic business of no little profit or extent. A visit to any of the large markets at the seasons specified, where they are a constant feature of the game-stalls, will verify this statement. Rice-birds (bobolinks, as we know them farther north), golden-winged woodpeckers, red-winged starlings, and cedar-birds (the last chiefly in winter) share a like fate.

Our complaint is directed against the destruction, for purposes of food, of one and all these species, but especially the robin. It may be legitimate to destroy the rice-bird and starling at the time and place of their devastation, but this does not sanction their slaughter in districts where rice does not grow, and the species are beneficial to crops. If practical ornithologists are not wholly in the wrong, it is neither wise nor legitimate to destroy the robin under any circumstances. The robin nests familiarly in and about gardens and orchards in large numbers when unmolested, rearing two and sometimes three broods, of four or five young each, in the season; and although he makes raids oftentimes into the strawberries, cherries, and other small fruits, it is a cheap toll for the incalculable services which he has previously rendered. Instead, however, of being protected by laws generally prevalent, they are but partially protected during their breeding-season in the north, to be killed on the spring and fall migrations.

Notwithstanding the great productiveness of a species, its numbers must be very materially diminished by the thousands, and probably tens of thousands, annually shot down for the market. It should also be remembered that the destruction of these birds in spring is particularly fatal, since with each pair thus killed we kill the possible young of the same year.

The human and brute enemies of the birds have been amply alluded to, but I have seen no reference to the trade in skins and eggs which has rapidly grown up in the past few years. In obscure corners of most cities of considerable size, persons may be found who deal in birds' skins and eggs, old coins, postage-stamps, and various other specialties, conducting a largely juvenile trade through the post. Their bulletins are now sown broadcast, especially among the boys' boarding-schools of the country. They offer tempting exchanges, premiums in eggs to the largest buyer, and give the price of eggs singly or in 'sets.' In most cases there is no identification, no date or locality given, so that the scientific value is usually lost. With such educating influences as these, how can we expect the thoughtless small boy, and better class of older boys at schools, to regard egg-nesting as any thing more than harmless employment, to be carried on as extensively as that of stamp-collecting, only with much less method? In framing laws to protect the birds, would it not be well to prohibit the sale of their eggs and skins for all such amateur and pseudo-scientific purposes?

Furthermore, with all these human and brute enemies with which our native birds have to contend, what possible excuse can be found for adding a still more deadly and effectual agent, — the business-like slaughter of useful species for food? If, indeed, the game-market was understocked, other birds might be had which are not to be commended as highly for either song or utility.

People who encourage this kind of traffic, in respect to the robin at least, are either thoughtlessly or wilfully robbing our lawns and orchards of one of its heartiest and most cheerful songsters, and agriculture of an indispensable friend and ally. F. H. H.

Baltimore, March 1.

In a recent number of the Indianapolis *Times* there appeared an article on bird destruction, containing the following extracts given by a well-known taxidermist of that city. They will not only serve as additional evidence of the destruction of birds for personal adornment, but also bring into notice, in this regard, a portion of our country which has not yet been mentioned, and will give the evidence of one who should be posted concerning that which he tells.

"It is a very inexpensive and simple thing to mount birds for millinery purposes, and the number who can engage in it is so large that no county in the state is free from the ornithological murderer. If the present rate of destruction is continued, which is equivalent to saying that if the fashion in millinery does not change, the state will be depopulated of its birds in five years. I have lately spent whole days in the woods without seeing a bird, except the unspeakable sparrow. Last year there were shipped from this city 5,000 bird-skins collected from the Ohio valley, chiefly from Indiana. Now, suppose that half of these birds were females: they would lay, on an average, five eggs each in a season, — a total of 12,500 eggs. Of these, 10.000 probably would hatch. Added to the 5,000 birds killed, here is represented a yearly destruction of 15,000 birds, — a sacrifice to fashion.

"It is important to note that this represents only the slaughter of the fashionable birds. Styles change. A year ago blackbirds for women's hats were in great demand, and thousands of them were killed. Now there is no market for blackbirds. Each of the 5,000 birds sent out of the state during the year 1885 was in style; that is, was either a jay, yellow-hammer, cedar-bird, or an owl. These birds are shot and skinned, and the skins allowed to dry before shipment. One man to whom I sent birds this week shipped 75,000 skins of American birds to France, and each year he duplicates this shipment. But the most of the American birds are sold at home. They are sent to the Long Island factories, where the skins

are steamed until pliable, when they are dressed and colored. Often the small, cheap birds are cut up, and the parts patched together in imitation of some pretentious songster. The dyeing is a secret process; and the birds are so manipulated, that often a Hoosier jay is palmed off as the rarest warbler of the tropics. This year, owls promise to become popular west. East they are already worn by the leaders of fashion. You may look for them upon the streets here soon.

"The profits of this business are very large. The Indianapolis collectors pay from seven to twenty-five cents each for the skins of jays and yellow-hammers, and from twenty-five cents to a dollar for owls. An expert skinner can prepare from fifteen to twenty-five an hour; and, if birds are easily found, he easily, therefore, makes money at the business. Prepared for the milliners, the birds (exclusive of owls) cost, on an average, from twenty-five to forty cents: they are sold to milliners at from a dollar to a dollar and a half, and the milliners retail them at two dollars and three dollars and a half. At the factories cheap labor is employed. Girls at two dollars and three dollars a week are competent to do all that is required in preparing the birds for use."

There are some statements in the above which I doubt; but, having no statistics to the contrary at hand, I have given them without comment.

The law of Indiana for the protection of its song-birds is farcical in its language, and is rarely enforced. It enumerates the species which are intended to be protected; but so many English birds are included, that one is forced to smile at the very thought of it.

AMOS W. BUTLER.

Brookville, Ind., March 1.

A recent ice-storm.

I think that the answer given by Mr. Philbrick (*Science*, vii. 220), concerning the injury done to trees during the ice-storm of Feb. 11–13, is hardly sufficient to account for the facts. So far as I have been able to learn, the damage was most severe in localities along the coast, north of Boston. In this immediate vicinity the mutilation was excessive. The poplars suffered by far the most, and the elms sustained nearly as great injury, and after them would come the red-oaks, pitch-pines, maples, and white-pines. The birches were little affected, and the apples and horse-chestnuts not at all. In some cases the poplar trunks were left nearly bare. The uppermost limbs of the elms sustained greater injury than those lower down, as Mr. Davis indicated. I attribute that mainly to their position. They caught and held so much of the rain, as it fell, that the accumulation of ice was much less on the branches beneath. My observations have not shown much splitting at the point of bifurcation. A careful examination of an extensive area has shown that most of the broken limbs of the elms were twisted off, with splintering of the wood for several inches, and only occasionally one was found which had been broken off squarely. It seems clear that this result was brought about by a want of symmetry in the horizontal subdivisions of the branches. When such branches were well loaded with ice, gravity not only bent them downwards, but also produced a considerable torsional effect at a point usually quite near their union with the trunk. The apples and the horse-chestnuts seem to have escaped by reason of the fewness of their small limbs.

L. A. LEE.

Bowdoin college, Brunswick, Me., March 6.

Apropos to Pteranodon and Homo.

Professor Holder's explanation that the human figure was simply put with Pteranodon for the sake of comparison of size, reminds me that some years ago I got from the cretaceous deposit of my neighborhood enough fossil material to diagnose a new species of reptile, which, although with powerful paddles, was almost pythonic in structure, and warranted the belief that the animal was hardly less than twenty-five feet long. As an Irish digger had struck upon the relics, and the too general habit is to destroy rather than save these finds, I succeeded in enthusing the laborers by drawing a restoration of this 'sea-serpent,' to their amazement. This the boss digger had framed and suspended in his cottage. To my sorrow, the thing made me famous, for it became so much talked about that reporters came from the great city. A pictorial journal sent an artist, who borrowed my crude sketch, and elaborated it under his own conceptions. Judge of my surprise when, with full credit to my name, the said journal appeared with an account of the resurrected ancient sea-serpent, and an engraving of the same, sporting in the ocean, and in the distance a three-masted ship in full sail! As in Professor Holder's case, there was no explanation given that the ship "was introduced in the cut to give people some idea of the size of the animal."

SAMUEL LOCKWOOD.

Freehold, N.J., March 5.

Is the dodo an extinct bird?

Has the guardianship of the 'mysteries of theosophy,' or his concern for the social organism of the world, lest they escape him (see Washington *Weekly star*, Nov. 20, 1885), so far rendered my aged friend, Dr. Coues, insensible to the progress of American ornithology, or current ornithological literature, as to have him overlook the fact, that, twenty days previous to my propounding the above question in *Science*, I had said in the *Century magazine*, "Of all the birds extirpated within the last few centuries, none can claim an equal share of interest with the famous dodo" (January, 1886)?

Since I published my opinion in the *Century*, many, many people — not naturalists, but those who take interest in such things — have asked me whether science was absolutely certain of the extinction of the dodo, as many quite recent popular works upon natural history have it that it may still be found in Madagascar. It was for these estimable people that I asked the question in *Science;* and fortunate indeed are they, that it has been answered for them by one of the leading ornithologists of this country, and in whose opinion, upon this point at least, I have most certainly always concurred.

R. W. SHUFELDT.

Fort Wingate, N. Mex., Feb. 25.

Chinook winds.

Warm west winds answering to the 'Chinook' winds occur as far south as southern Colorado, though I have seldom heard the name 'Chinook' applied to them in this region. They are here often called Pacific winds, also 'snow-eaters' and 'zephyrs.' They are the most violent winds we have at this place, as we are sheltered from the northers.

G. H. STONE.

Colorado Springs.

SCIENCE.—SUPPLEMENT.

FRIDAY, MARCH 12, 1886.

THE ROCKY MOUNTAINS AS SEEN FROM THE CANADIAN PACIFIC RAILWAY.

THE foot-hills of the Canadian Rockies are not like those of the south, — huge piles of sandstones, bristling with 'monuments,' and hirsute with sparse forest. After a few smooth, grassy benches and rounded hills, here come precipitous ranges of real mountains, scarcely less imposing than those of the central mass. Trees among the outer benches are rare. You see some willows, a hemlock, and the stubbed Pinus albicollis, which is not good as timber. Near Calgary the first of the magnificent Douglas spruces present themselves, — those gigantic and valuable timber-trees, for which the north-west coast is famous. They are of small size here, and stand in little clumps in the ravines.

The Rocky Mountains at this point have trended so far westward, that here they are overtaken only in the meridian of Salt Lake. The first line of heights is a rank of bluffs with almost vertical faces, each ledge marked by well-kept snow, which stretches away northward in orderly array. This is the Palliser range. The most prominent point of it is a forward-set peak visible from a wide radius of plains. In shape it is like a pretty tall stump, or the lower half of a lighthouse, and is called the Devil's Head; but the Indians, with better discernment, say it is the Devil's *neck*, and have a story about the disappearance of the head it once sustained. Behind the Palliser is the slaty Sawback range, from beyond which comes the Bow River, through deep cuttings.

In these foot-hills lives a small Indian tribe, of Dakotan stock, termed Stonies, who are fine-looking fellows and good hunters. They came there within a generation or two, and never go out on the plains except in war-raids against the Crees or the half-breeds, to whom they have given much trouble. The Hudson's Bay company set up its southernmost trading-post among them a few years ago, called the Old Bow Fort; and close by they now live on a reservation, the station for which is Morleyville.

Though the mountains here seem grand enough, having a sublimity not easily equalled among any of the loftier ranges southward, yet they must be spoken of as 'depressed' north of the boundary, since the tallest peaks do not much exceed 11,000 feet above the sea, and none of the passes are over half that. There are several fine passes over the first range, between the parallels of 49° and 53°. The southern one is Kootenay, much used formerly by the Indians, then Howse's, then that where the Kananaskas heads, then the one taken by the Canadian Pacific railway up the Bow and across to the valley of the Kicking Horse, and lastly the Yellow-head, or Leather pass under latitude 53°. Many of the principal peaks in this range were long ago named Balfour, Forbes, Hooker, and Brown, by the lamented botanist Douglas, after English men of science.

The breadth of the Rocky Mountain system (six hundred miles) in the middle United States is narrowed northward, until in Canada it consists of three compact serrations. The easternmost bounds the plains, and stretches from the sources of the Missouri to those of the Peace and the Yukon. Its eastern face presents a bold front; but its western flank is more broken up, and, not far from the boundary line, gives source in two 'mother-lakes' to the mighty Columbia, which thence flows northward in a powerful stream until it has passed the fifty-second parallel, nearly two hundred miles north-west of its starting-point. Then the mountains upon its left break down; and the Columbia, turning sharply around their head, moves straight southward on its course to the sea. Stretching north and south between Kootenay lakes and the great bending of the Columbia, stands the magnificent second range of mountains, — the Selkirks.

The course of the Columbia after it has turned southward around the head of the Selkirks is beset by lofty walls as before, for west of its banks rises a third chain, called the Gold range, whose farther slopes feed the Fraser and Okinakane. Thus three unexplored, lofty, and glacial ranges of mountains, and two first-class river-crossings, opposed themselves to the engineers of this railway when the northern route was abandoned and the present line accepted.

The profile of the Rockies seen at the eastern entrance is extremely irregular. There is no stately line of granite domes, nor bristling quartzite peaks, nor symmetrical volcanic cones: the sky rests upon a jagged wall, every elevation having some angular and abrupt form quite unlike its neighbor.

All this grandeur of outline, which gives a tenfold savage aspect, is intensified by the excess

of snow and ice borne winter and summer upon their naked heads, — the most striking fact in their scenery, a description of which cannot be attempted here.

The Bow River, at the point where it breaks through its 'gates,' is a swift, deep stream of pea-green water. We follow it for several miles through a low forest, which occupies a large valley parallel with the main range, and between it and an outlying one, which is somewhat analogous to the parks of Colorado. Near the southern end of this valley is the station Banff, — the locality of a huge sulphur-spring. This occupies a pit which has a chimney-like entrance, and broadens below into a chamber of considerable size. In the bottom of this boils up a powerful spring strongly impregnated with sulphur, and almost too hot for bathing. The interior of the cavity abounds in masses of crystals, splinter-like, brittle, translucent amber in color, and extremely beautiful, which, fortunately, are carefully protected by the owner. That the spring was formerly more copious, is shown by the oven-shaped tank it has built up more than forty feet above the present surface of the water.

Just beyond the impressive berg named Castle Mountain, which, like most of its fellows, has as many curious forms as you can find changed points of view, in the valley of the Bow River, the traveller gets sight of the first of the great glaciers which are a distinguishing feature of the scenery in the Rocky Mountains of British Columbia. It is a broad, crescent-shaped river of ice, the farther part of which is concealed behind the lofty yellow cliffs hemming it in. You seem to be almost on a level with it, and near at hand; but it is a dozen or more miles away, and fully fifteen hundred feet above you.

The forest is not noteworthy until the top of the pass (altitude about five thousand feet) is reached, when the eye gazes across miles of magnificent evergreens, filling the great depression through which the young Kicking Horse rushes from cataract to cataract, down to the westward. The Cathedral and Mount Stephen represent the supreme heights of the continental divide at this point. They are magnificent mountains, and surrounded by scores like them, unspeakably precipitous, rugged, and noble. On every side, as you make your way along, stand great cliffs, bearing prodigious weights of clear ice or almost equally solid and glittering masses of snow. In spite of this ruggedness, the gradient adopted by the railway is surprisingly low, and trains will be able to run at great speed; a schedule allowing only seventy-two hours between Montreal and the Pacific going into operation next May.

It is rather farther down from the summit on the western side than on the eastern. The exit is made through a narrow cañon, picturesquely filled by the turbulent stream; and beyond, with the grandest surprise, you emerge upon the valley of the Columbia, and are face to face with the long, splendid range of the Selkirks.

Crossing the Columbia on a fine truss-bridge, the railway runs down its margin, close under the steep, wooded foot-hills of the Selkirks. Several miles below, it turns into the narrow gateway through which the Beaver finds a straitened exit (like all the streams of this region), and ascends its gorges by ingenious engineering to the summit of the range, thirty-four miles (by rail) west of the Donald crossing, and 4,350 feet above the sea.

The principal difficulty in construction, along this part of the line, was occasioned by the many torrents which come down the very steep mountain-side, often in splendid cascades. To span these fierce torrents by bridges or culverts which should not fail, required great skill and liberal expenditure.

Among these bridges is the loftiest wooden structure of its kind in the world. It crosses Stony Creek, — a noisy rill at the bottom of a V-shaped channel cut deeply into the soft rock of the hillside; and the track is no less than 295 feet above the water. This bridge is supported upon two towers of wooden crib-work, erected upon masonry the foundations of which are solid rock 75 feet below the surface. This bridge is about 750 feet long, cost $250,000, and was built in a very short time. It is exceeded in height by only one railway-bridge in the world, — the iron one lately put up at Kinzua, Penn.

The approach to the summit is through a narrow passage between enormous precipices, down one of which pitches a waterfall several hundred feet in unbroken height, white and dusty like snow; and at the summit the glacier of which it is the outlet comes into view.

This glacier has an area of several miles, and its head cannot be seen from the pass. It is wedge-shaped, and in August was so dusty white, where the surface had been honey-combed by the sun, or powdered by the frequent storms, that it was not easy to say where it ceased and the inclined snowbanks lying under the shelter of the huge black combing began. Streaks, patches, and marbling of vivid blue (or, in some lights, green) could always be detected, however, where the solid ice was exposed; and the whole picture was irresistibly attractive. The foot of this glacier is approximately 7,350 feet above the sea, and is overlooked by Carroll's and two or three neighboring peaks, towering three thousand feet higher.

A little to the westward are other smaller and more easily accessible ice-masses, which plainly show a recent retreat; and two miles west of the summit one comes into view of the greatest of the visible Selkirk glaciers. It is overlooked by the stately monolith of Syndicate Peak, and the ice comes curving down to within a mile of the railway, feeding a copious stream. It is only about a thousand feet above the level of the rails; and, when a trail has been cut through the thickets in the ravine, it will be very easily reached, though one should no more attempt to go upon it without proper ice-creepers, ropes, etc., than he would in the Swiss Alps. I predict that the Agassiz glacier, if I may so name it, will be as famous an object of adventurous pilgrimage in a few years as any in Europe. ERNEST INGERSOLL.

THE ORIGIN OF HUMAN RACES AND TYPES.

ONE of the most inexplicable subjects in the evolution of man has been his racial persistency. The teachings of Agassiz are yet familiar, and the thorough and abundant testimony of Morton, Nott, and Gliddon has demonstrated the permanency of the great races of mankind. The peculiar physiognomy of the Jew stands out as clearly in the early Egyptian records as at the present day. Food, climate, the most diverse environmental conditions, all appear to cause but little modification in racial type. The evidence from his earliest known periods of existence throws but little light upon his immediate origin, and the opponents of evolution have long found great satisfaction in the few proofs of lower affinity that his fossil remains present. Certainly there must have been factors in his earliest development that we have not yet taken into account. When and where did the African, the Caucasian, the Malayan races first become fixed, and why have the causes that long ago led to their differentiation ceased to be active? An answer to this question, deserving consideration, has lately been attempted by Moritz Wagner (*Kosmos*, 1886, p. 23).

It has long been recognized that one of the strongest factors in the artificial production of new varieties is in-and-in breeding, — the repeated crossing, within narrow limits, of the progeny of related parents. It is rarely in any other way that the impression of peculiarities can be combined and not antagonized in the offspring. All breeders or growers are aware that the organism, be it vegetable or animal, acquires with every such repetition greater plasticity and capability of change, and that it can arrive at a considerable degree of differentiation only when free crossing is hindered or prevented for a sufficient length of time for these variations to become fixed, and not dissipated. In nature, strong proof of the same law is afforded by the faunal and floral peculiarities of regions isolated by natural barriers. The Galapagos and the Hawaiian islands, notwithstanding the uniformity of climates and general conditions, show striking diversities in animal and plant life among themselves, — the result of crossing among nearly related forms. Isolation, from whatever cause it may be due, throughout all animal and vegetable life, brings almost inevitably variation, due to the limitation of crossing, and the consequent fixation of characters.

But, in both of these respects, man has, in all his known history, been strikingly at variance with all other members of both the animal and vegetable kingdoms. In him alone, among all living creatures, exists the instinctive aversion to crossing between near blood-relations, — an aversion that predominates in every grade of civilization, from the cultivated races to the Eskimo, Hottentot, or Australian. Indeed, among the lowest tribes, the aversion is often strongest, and incest not unfrequently is punished by death. Most assuredly, man will not form an exception to a law so potent for change among other animals; and we see, in this custom of marriage between those unrelated, the most important factor in the production of varieties removed, and we can understand the difficulty of the formation of new races. The very acceptance of man's origin recognizes the certainty that some time in his development this instinct has been acquired. In the earliest period it did not exist, and he was then subject to the same laws of variation as the ape and the dog. It was to this period that the chief divisions of mankind evidently date.

Every thing goes to indicate that man's origin extends back far into the pliocene age; and evidently in his early stages he differed little, in his habits, from wild animals of the forest. Without clothes and habitation, he depended upon the free gifts of nature for food and shelter, without family instincts, and, what seems to be a necessary concomitant, without any sexual aversions whatever. With the great climatic changes of the glacial period, all this was changed. The struggle for existence became bitter: sustenance, shelter, and clothes had then to be acquired by the exercise of brain and hand. Migrations to the most favored and isolated locations were the inevitable result, and the necessity of protection of offspring became the contingency of existence. Family life took the place of more brutal instincts,

and the child remained longer dependent upon the parent. But with the constant association of near relatives an aversion was acquired to close intermarriage, resulting in the custom, or rather instinct, that now characterizes all classes of mankind. The chief factor of change thus ceased its operation, but the formation of races had already occurred.

Thus the author would account for those primitive and wide divergences that must once have taken place. With his development and acquisition of language, man became the most cosmopolitan of animals; tendency to further divergence was checked, and is now rather toward homogeneity. Anthropologists are fast recognizing the futility of separating tribes and classes by cranial classification. Very great variations are found between dolichocephalic and brachycephalic types among all civilized or uncivilized races. The pure Germanic race of the blond type is disappearing, as Virchow has shown, and greater racial uniformity is becoming apparent. The larger part of the German people is a mixture between the light-skinned indigenous race and the dark-skinned Indo-European races. Free crossing prevents the further formation of striking changes; but, with the development of civilization, a new and subordinate factor is taking, in a measure, its place, — that of national and social caste, which tends to the formation of minor variations. The peasant and the noble, the Jew, the German, Frenchman, or Englishman, — all are differentiated by very tangible characters, the result of partially restricted crossing, from social causes. Thus in man's history we see the unrestricted crossing of bestiality, fruitful in change; the acquired humane instincts averse to pairing between blood-relations, and eager for remote and strange mates; and, finally, the prejudices of social and political castes that lead to the formation of minor variations.

AN OLD-FASHIONED BOOK.

THIS volume seems to be in its principal features an abridged translation of Weber's 'Lehrbuch der weltgeschichte,' to which, indeed, Dr. Fisher acknowledges his great indebtedness, especially as to ancient and mediaeval history. As to the need of some such book as the one under review, there can be no question. Teachers still, even in many of our best colleges, use the old mechanical method of teaching history. We call it the mechanical method with no intention of discrediting it; for there is no doubt but that, in the case of the great majority of our history teachers, the safest way is to put a good book into the hands of the student, and make him commit to memory so many pages a week. To be sure, he forgets most of his facts as soon as possible after the examination. But, on the other hand, if the book is a good one, he has learned very few things which will have to be carefully unlearned in after-life. The best example that occurs to us, of the working of this system, is with regard to the teaching of botany in one of our smaller sectarian colleges not so very many years ago. The text-book was large, and well supplied with poor pictures. The class came in regularly: they could not be absent without excuse. As soon as the man in charge had satisfied himself that all were present, he said to N. or M., 'Proceed.' N. or M. proceeded to recite from memory the opening paragraph of the day's lesson. When the man in charge thought he had recited enough, he ordered another boy to 'proceed.' Then came reviews and second reviews. At the end of the term or year the boys knew the book by heart. As they had never analyzed a flower, or applied the knowledge thus gained in any way, their botanical wisdom was very slight. To this day, most of them know absolutely nothing of botany, though still able to recite page after page of the large and very dry text-book. So it is with history. A man may know a hundred dates. He may know, for instance, that Magna Charta was signed by King John on June 15, 1215; but if he knows nothing about the document itself, what it meant, who drew it up and why, under what circumstances it was signed and why, he may be said to know nothing about the most interesting document in the history of the Anglo-Saxon race. He may know, too, that the first perfect parliament was summoned by Edward I.; but, if he knows no more, he may with truth be said to be utterly ignorant of an event which John Richard Green has denominated 'the most important event in English history.' Still, books giving such general knowledge of the world's history have their place.

Professor Fisher has undoubtedly put much time and labor into the making of this book. Portions of it are well done — exceedingly well done. It is also very well proportioned, and in its arrangement no fault can be found. We are conscious, too, of the enormous labor involved in getting out such a work. But all these considerations only add to our regret that Dr. Fisher did not use still more care in his original writing, and exercise very much more vigilance in his proof-reading; then he might have produced a book that would have remained the standard work, of its size, for a very long time. Let us call attention to

Outlines of universal history. By G. P. FISHER. New York, *Ivison, Blakeman, Taylor & Co.*, 1885. 12°.

a few errors, which, though trifling in themselves, have given us a distrust of the whole book, and especially of that portion dealing with modern history.

The first sentence is from p. 295, and is as follows: "John (surnamed Sansterre or Lackland, a name given to younger sons who died before they were old enough to hold fiefs) was chosen king." Of course, this statement is absurd. It is singular that Professor Fisher should not have seen it; for the definition is correctly given by Miss Thompson, whose admirable 'History of England' the author seems to have read with some care: "John, surnamed Sansterre or Lackland (a name given to younger sons whose fathers died before they were of age to hold fiefs)." Then, again, take the following from p. 315. The author has been speaking of Llewellyn, and goes on to say, that, "when a rebellion broke out several years later, Wales was conquered, and the leader of the rebellion executed (1273)." Now, of course, the author knows that Llewellyn was killed in a chance skirmish, and that it was his brother David who was executed in 1283, not 1273; but he should have said so. Then, too, on the very next page (316), the date 1292, which is assigned to the defeat of Warrenne by Wallace at Stirling Bridge, should be 1297; while on the following page (317) Isabel is said to have returned from France, bent on the overthrow of her husband, Edward II., in 1325, instead of 1326. Now, here, on three successive pages, are three dates — and three very important dates — wrongly given. No doubt they are misprints, or mere slips of the pen; but the greatest care should have been taken to prevent just such errors. It must not be supposed that such failings are confined to this part of the book, or to English history, as, in whichever direction we have turned, the same want of care has been observed. In American history, in European history, and even in ancient history, similar errors have been found.

The sections devoted to the history of the people — to the literature, theology, art, etc., of the different periods — are good as far as they go. The maps of classical times are mainly printed from the same plates as those in the 'Standard classical atlas,' issued by the same publishers (*Science*, vii. p. 51): those relating to more modern events, while not so large, are clear and fairly accurate. The most serious omission in this part of the book is the lack of a map showing the partitions of Poland. Taken altogether, the maps add something to the value of the work. So, too, do the various genealogical tables; while the little bibliographies, though very general, will serve to start the inquiring student in the right direction. It is to be regretted that an insufficient index impairs whatever usefulness as a work of reference the volume might otherwise have had.

COMPARATIVE DISTRIBUTION OF JEWISH ABILITY.

THE pronounced racial characteristics of the Jewish people, with their remarkable persistency of type, have always rendered them a favorite subject for ethnological study. The peculiar environments in which they have been placed, and the almost constant persecution to which they have been subjected, have certainly given their impression to the mental characteristics of the race, and in many respects we see these as sharply portrayed as the peculiar physiognomic cast.

Mr. Joseph Jacobs has recently published (Journal of the anthropological institute of Great Britain and Ireland, February, 1886) an analysis of the characteristics of more than thirty thousand eminent men with especial reference to the Jewish race. The conclusions he arrives at are of the greatest interest, and in some cases unexpected from the crude inductions of common experience.

Jews have no distinction whatever as agriculturists, engravers, sailors, and sovereigns. They are less distinguished than Europeans generally, as authors, divines, engineers, soldiers, statesmen, and travellers, but approximately their equal as antiquaries, architects, artists, lawyers, natural scientists, political economists, scientists, and sculptors. They seem to have superiority as actors, chess-players, doctors, merchants (chiefly financiers), metaphysicians, musicians, poets, and philologists. One would, however, have expected a much larger contingent of lawyers and political economists than is actually found, and art is better represented among them than one would suppose. The sciences also, both biological and exact, show a greater equality than most people would expect. As regards the former, of course Jews have no Darwin. It took England a hundred and eighty years after Newton before she could produce a Darwin: and as the Britishers are five times as many as the Jews, even including those of Russia, it would take, on the same showing, nine hundred years before they could produce another Spinoza; or even, supposing the double superiority to be true, four hundred and fifty years would be needed. But, even in the lower ranks of biology, Jews have done and are doing good work. Bernstein, Cohn, Remak, Rosenthal, and Valentin as physiologists, Cohnheim, Hirsch, Liebreich, Lombroso, and Traube as pathologists, will be recognized; while F. Cohn is perhaps the third greatest botanist in Germany. It

is in abstract science, mathematics and astronomy, that Jews show to more advantage. The history of pure mathematics during this century would show large blanks if the names of Jacobi, Sylvester, Kronecker, and Cremona, were removed. In astronomy we have the cluster of Herschels, Goldschmidt (who discovered fourteen asteroids in the 'fifties' and 'sixties,' when such discoveries were not an every-day occurrence), and W. Meyerbeer (brother of the musician, and author of the first great chart of the moon). Altogether, then, we must conclude that Jews take their full share in the scientific work of the day. In Sir John Lubbock's 'Jubilee speech at York,' we find eight Jewish names out of the two hundred and eighty-nine who are mentioned as contributing to the last fifty years of science: this is considerably above their proper proportion, even when including the Russian Jews. Again: in M. de Candolle's book, 'Histoire de science,' there are ten Jews holding sixteen out of the eight hundred and twenty-four chairs as foreign members of the scientific academies, which fact he uses as a test of scientific ability. This is just the right proportion, the Jews of Europe being seven out of three hundred and thirty-three million.

Less surprise will be felt at the subjects in which Jews seem to show superiority. In acting, a profession better recognized on the continent than here, — and the same may be said of medicine, — in Austria, one may say *ubi tres medici duo Judaei.* The Jewish merchants who get into the dictionaries are, of course, the great financiers. But it is chiefly in music and philology that Jewish superiority is most marked: in music there seems to be six times, and in philology nine times, as much Jewish talent as European. For the former, besides the great names of Mendelssohn, Halévy, Meyerbeer, and Rubinstein, already mentioned, we have many lesser lights, like Sir Julius Benedict, Sir M. Costa, F. Cowen, Joachim, Pauline Lucca, Moscheles, and Sir A. Sullivan. English music, to say the least, would be almost non-existent without these Jewish names. Even more striking is the number of Jewish names distinguished in philology. These are not alone connected with oriental and Semitic philology, like Benfey and Oppert; but they count a goodly number of classical scholars, — Bernays, Bernhardy, Lehrs, Friedländer, and H. Weil, to whom we may add Freund, the author of the Latin dictionary, which is the basis of all those used in England. The names of Lazarus and Steinthal are known wherever the principles of philology are studied. In modern languages, too, Jews have done good work. Sanders has done for German what Littré did for French; and a Jew, the well-known Ollendorff, may claim to have taught languages to the largest number of people by the clumsiest method of teaching.

If we may venture to inquire into the causes of the Jewish superiority established on these somewhat hypothetical grounds, there are various reasons which can be given. We have to take account of their residence in cities, always more conducive to the life intellectual. From this, too, follows their addiction to commerce as distinguished from industry; and as the former implies headwork, and the latter handicraft, mental capacity must be aided by this fact. The care Jews give to their children's education is well known, and must help. All Jewish boys have hitherto had to learn Hebrew, as well as the vernacular, and this must further mental progress. Dissenters generally seem more intellectual, because they have early to think out their differences from the generality. In the case of Jews, persecution, when not too severe, has probably aided in bringing out their best powers: to a high-spirited race, persecution, when there is a hope of overcoming it, is a spur to action. The solidarity of Jews, and the aid they willingly give to young men of promise, assist in developing whatever talent there may be in the community. The happy home-life of the Jewish people, and the practical and undogmatic character of their religion, together with the absence of a priesthood, have contributed to give the *corpus sanum,* and thus the *mens sana.* Jewish reason has never been in fetters; and finally the weaker members of each generation have been weeded out by persecution, which tempted or forced them to embrace Christianity, and thus contemporary Jews are the survival of a long process of unnatural selection, which has seemingly fitted them excellently for the struggle for intellectual existence.

Turning from these general causes, it would be of interest to discover the reasons for the special ability of Jews in music, mathematics, metaphysics, philology, and finance. The chief cause of the musical pre-eminence of Jews, lies, in all probability, in the home-character of their religion, which necessarily makes music a part of every Jewish home; this, too, was the only direction in which their artistic sensibilities could be gratified. Jewish philology is in part due to their frequent change of country, and also to the fact that they have had an additional sacred language besides the vernacular. As regards finance, the Jews have had their greatness thrust upon them: the world forced them to become financiers centuries before finance became a power, and must not complain if Jews now profit by their start in financial experience. Altogether, the productions of Jewish

intellect strike one as being predominantly abstract, — a result, doubtless, of their long life in cities, and exclusion from nature on the one side, and from the education which lies in handicrafts on the other. We may expect great mathematicians and philosophers from them, but not great inventors, biologists, or painters, till they have had time to throw off the effects of their long seclusion from nature.

RECENT CHALLENGER REPORTS.

Report on the Schizopoda (vol. xiii.). By Prof. G. O. SARS. London, *Government*, 1885. 4°.

THE Schizopoda and Cumacea collected during the voyage of the Challenger were placed in the hands of Professor Sars of Christiania for examination and description, and very wisely, for he had done more to elucidate these groups than all other authors combined. This report, by far the most important addition yet made to our knowledge of the Schizopoda, more than justifies the English authorities in intrusting certain portions of the Challenger collections to foreign naturalists. Fifty-seven species of Schizopoda, representing twenty-one genera, are here fully described and very carefully and elaborately figured by the author himself, who says very truly that the collection "has turned out extremely rich, and of very special interest;" but this result is undoubtedly very largely due to the great care with which Professor Sars has examined the miscellaneous material collected in surface-nets, and submitted to him. Forty-six of the fifty-seven species were first made known by the Challenger expedition, and the elaborate working-out of this large number of new forms from widely different regions and depths affords most important new material for discussing the proper subdivision of the Schizopoda and their relation to the other Crustacea.

Professor Sars, I am glad to see, regards the Schizopoda as a suborder distinct from but closely allied to the Decapoda proper, and retains with them the Euphausiidae, in spite of Dr. Boas' arguments that they should be regarded as a distinct order. He also shows that the genus Eucopia, which has been referred to the Penaeidea by Dana and Bate, is a true schizopod, though representing a distinct family. Thus we have four families of Schizopoda: Lophogastridae, Eucopiidae, Euphausiidae, and Mysidae.

The Lophogastridae, which, previous to the Challenger expedition, was represented by a single genus, is here augmented by the remarkable genus Gnathophausia and two new genera. Of Gnathophausia, which was first made known by Willemoes-Suhm during the progress of the expedition, and contains the largest known schizopods, no less than nine species are here described, one of them over six inches in length. The anatomy of the genus is carefully worked out, and its affinities to Lophogaster well shown. All the species of the family appear to be inhabitants of deep water.

The account of the Euphausiidae is the most important and interesting part of the work. Nearly all the species of this family are pelagic in habits; and Professor Sars' careful examination of the surface collections made on the expedition has not only added largely to the number of species made known, but has enabled him to bring together and describe many of the post-embryonal stages of several of the forms. Twenty-eight species representing eight genera of the family are described, and twenty-three of the species and four of the genera are new. The entire anatomy of several species is worked out, and the articular appendages of nearly all of them are figured in detail. Under the genus Euphausia, the peculiar eye-like organs situated on or between the bases of the legs are very carefully described, and apparently well shown to be luminous, and not visual organs. Although many of the species of the family are often taken in the greatest abundance, egg-bearing females are only very rarely seen; and, until very recently, nothing was positively known in regard to the manner of carrying the eggs, a single long-ago-recorded observation of Bell being somewhat doubtful. Professor Sars, however, has now found species of several different genera, carrying masses of eggs beneath the body in the same position as in other Schizopoda, though not enclosed in a pouch formed of lamelliform appendages, thus confirming Bell's observations and those of the present writer, published in 1884.

In the chapter on the development of the Euphausiidae, post-embryonal stages of species of Nyctiphanes, Euphausia, Thysanopoda, and Nematosceles, are carefully made out, and fully described and figured; and this is all accomplished with what is usually regarded as the refuse from the surface-collecting net. These investigations fully confirm the observations of Claus, Sars himself, Metschnikoff, and the present writer, and show that the typical Euphausiidae are hatched, like barnacles and copepods, as true nauplii, with unsegmented body, no compound eyes, and only three pairs of appendages, and that they pass through a long series of intermediate stages to the adult condition. Sars regards this nauplial development as characteristic of all the Euphausiidae, which seems somewhat doubtful when we consider the small number and

enormous size of the eggs of one of the species of Stylocheiron here described.

The Mysidae were far better known than the other Schizopoda, and the account of the Challenger species is consequently less important than that of the other families; still sixteen species belonging to nine genera are described. A short appendix contains descriptions of four ecto- and two endo-parasites of species described in the report.

The fact that the work was written in a language foreign to the author is scarcely noticeable, and errors are rare. A few mistakes have resulted from changes and additions during the progress of the work, as the failure to change the generic name of Amblyops australis on p. 12, and the incorrect statement of the number of genera and species on pp. 63 and 172.

The numerous excellent plates bear the impress of a Stockholm lithographer, and add to the international character of the work.

S. I. SMITH.

Lamellibranchiata (vol. xiii.). By EDGAR A. SMITH. London, *Government*, 1885. 4°.

THE report on the bivalve mollusks consists almost exclusively of a list of the various species comprised in the collection, with such remarks as appeared to be of interest, and of the descriptions and figures of the species new to science. The anatomical work on those species of which the soft parts were preserved has been placed in other hands, and is not yet published. The Rev. R. Boog Watson retains the gastropods and solenoconchs, but, after doing certain preliminary work, concluded to relinquish the present group, which was very appropriately placed in the hands of Mr. Smith, well known to all students of the invertebrates as the courteous and hard-working assistant in charge of the Mollusca of the British museum.

The Challenger collection of lamellibranchs was obtained from the dredgings at some hundred and fifteen stations, and comprises about five hundred species, of which four hundred and fifteen were found in water less than two hundred fathoms deep, nine in water over two thousand fathoms deep, and the remainder at intermediate depths. The greater part of the collection, therefore, is not of an abyssal character, and, in fact, forms an important contribution to the fauna of the Southern Ocean, and especially Australian waters; but the portion relating to the deep-sea forms is, of course, the most interesting and biologically most important, and will prove indispensable to all students of that branch of biology. The plates are excellent, and the proof-reading good, though we notice the references to plate vii., in the text, all read plate viii. A few species which came in at the last moment are represented by woodcuts in the text.

The collection shows that no special student of the Mollusca accompanied the expedition; for the opportunities were so great, that a qualified collector would certainly have done much better, both as to the number of species collected and in regard to their biography. It must be remembered that the Challenger party worked with much less perfect instruments and methods than are at present available, and that the loss of time incurred by the use of rope in dredging is doubtless accountable for the washing-out of many valuable specimens which actually got into their dredges. Mr. Smith is quite conservative in his estimation of what constitutes a genus, but we are inclined to agree in his decision that only one new generic group is represented in the collection. This is called Silenia, and is distinguished from Lyonsiella by both anatomical and conchological characters. It was found in the deep water of the South Atlantic. The general considerations of the report are brief. The remarkable sporadic appearance of several forms in widely separated localities (Red Sea and Fiji Islands, Canaries and North Pacific, Australia and West Indies, and the like) is instructively commented upon, though perhaps none of the cases are more remarkable than the recent discovery of Pecten pleuronectes by the U. S. fish commission in the West Indies. The wide bathymetrical distribution of certain species, shown for the West Indies in the preliminary notes on the Blake mollusks, is fully confirmed for other regions by the Challenger collection; e.g., Lima multicostata in two thousand and in one thousand and seventy-five fathoms. Neaera, Arca, and Amussium were among the most frequent and most characteristic forms of the deeper water. Callocardia appeared in very deep water, in about the same latitude, in both the Atlantic and Pacific. On the whole, Mr. Smith concludes that the lamellibranchiate fauna of the deeps possesses no special or extraordinary character. The species are fewer than in shallower water, and new or peculiar forms are still more exceptional. No special modification of color, epidermis, or weight, seems to be correlated with existence in the benthal zone; for most of the species found there belong to genera whose representatives are thin and pale, whether they are found in deep or shallow water. A tabular exhibit of the distribution in depth and area, of the deep-water species, would have been a valuable addition to the report, which has an excellent index to the text and plates.